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SHIP WITH SWIVELING PROPELLERS
[Senkaishiki puroperatsuki senpaku]

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[Claims] /2*

[Claim 1] A ship equipped with a propeller at the center of the ship for propulsion, a ship with swiveling propellers characterized by swiveling propellers for steering capable of swiveling around vertical shaft lines being provided to the right and left boards of the stern.

[Claim 2] The ship with swiveling propellers according to Claim 1, wherein a ship with swiveling propellers characterized by the above-mentioned propeller for propulsion being provided behind the bossing of the stern and by the above-mentioned swiveling propellers for steering being attached to the lower ends of struts protruding downward from the hull at either of the boards located posterior to the propeller for propulsion.

[Claim 3] The ship with swiveling propellers according to Claim 1 or 2, wherein a ship with swiveling propellers characterized by a ladder being located posterior to the propeller for propulsion and by the swiveling propellers for steering being located on the left and right sides of the ladder and away from the ladder.

[Claim 4] The ship with swiveling propellers according to any one of Claim 1 through 3, wherein a ship with swiveling propellers characterized by the above-mentioned swiveling propellers being designed to be able to swivel 360 degrees around vertical shaft lines.

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* Numbers in the margin indicate pagination in the foreign text.

[Detailed Description of the Invention]

[0001] [Technical Field of the Invention]

The present invention relates to a ship equipped with swiveling propellers for ship handling.

[0002] [Related Art]

In general, a ship is provided with a propulsive propeller 1 at the tail of the ship as shown in Figure 5 (front view of the stern) and Figure 6 (side view of the stern), and a ladder 4 is provided behind the same propeller 1. In some cases, a tunnel-type side thruster 5 is sometimes equipped to the ship's hull 2 so that the ship can be steered even when the propeller 1 is not in operation. However, it is known that the tunnel-type side thruster 5 generates high-pitched underwater noises and may causes inconveniences if used for a ship that uses hydroacoustic equipment such as an ocean research vessel or cable ship.

[0003] [Problems that the Invention is to Solve]

To cope with this problem, a means equipped with a swiveling propeller 3 at the lower end of a strut 3a protruding downward from the hull 2 at the center of the stern has been developed in order to provide the propeller 3 with dual functions of propulsion and steering by enabling it to swivel 360 degrees around the vertical shaft line. However, there is a problem in that such means makes it difficult to obtain high output for propulsion. The invention was devised to solve this problem, and its aim is to supply a ship with swiveling propellers capable of achieving high output for the propeller for propulsion while avoiding the occurrence of high-pitched underwater noises, which would be generated by a side thruster.

[0004] [Means for Solving the Problems]

In order to accomplish the above-described aim, a ship of the invention with swiveling propellers is a ship equipped with a propeller for propulsion at the center of the ship, and is characterized by swiveling propellers for steering capable of swiveling around vertical shaft lines being provided to the right and left boards of the stern. The above-described ship makes it possible to use sufficiently high output for the propeller for propulsion provided at the center of the stern. Moreover, the swiveling propellers for steering provided to the right and left of the stern enable efficient steering of the ship while significantly decreasing noises generated underwater in comparison to a conventional tunnel-type side thruster.

[0005] A ship of the invention equipped with swiveling propellers is characterized by the above-mentioned propeller for propulsion being provided behind the bossing of the stern and by the above-mentioned swiveling propellers for steering being attached to the lower ends of struts protruding downward from the hull at either of the boards located posterior to the propeller for propulsion. Because of the above layout of the propeller for propulsion and swiveling propellers for steering, the swiveling propellers for steering can be operated without influencing the flow of water through the propeller for propulsion.

[0006] A ship of the invention equipped with swiveling propellers is also characterized by a ladder being located posterior to the propeller for propulsion and by the swiveling propellers for steering being located on the left and right sides of the ladder and away from the ladder. When

a regular ladder is provided in addition to the swiveling propellers for steering as described earlier, steering of the ship during sailing can be performed even more accurately.

[0007] Moreover, a ship of the invention equipped with swiveling propellers is characterized by the above-mentioned swiveling propellers being designed to be able to swivel 360 degrees around vertical shaft lines. When the propellers for steering are designed to be able to swivel in the range of 360 degrees, there are the following advantages: the steering of the ship by means of the propellers is appropriate; and the same propellers can be used also for propulsion.

[0008] [Embodiments of the Invention]

In the following, embodiments of the invention will be explained by using drawings. Figure 1 and Figure 2 illustrate a ship of a first embodiment of the invention equipped with swiveling propellers. Figure 1 illustrates the front view of its stern, and Figure 2 illustrates a side view of the stern. Figure 3 and Figure 4 illustrate a ship of a second embodiment of the invention equipped with swiveling propellers. Figure 3 illustrates the front view of its stern, and Figure 4 illustrates a side view of the stern.

[0009] First, the first embodiment of the invention will be explained. As shown in Figure 1 and Figure 2, a propeller 1 for propulsion is equipped behind the bossing 2a of the hull 2 at the center of the stern, and the same propeller 1 is rotated by the main machine inside the ship via a propeller shaft that runs inside the bossing 2a. Moreover, swiveling propellers 3 for steering are attached to the lower ends of struts 3a

protruding downward from the hull 2 at either board located posterior to the propeller 1 for propulsion. These propellers 3 are rotate by an auxiliary engine or the like inside the ship via shaft systems that run through the struts 3a and can also be made to swivel around vertical shaft lines by another driving system. In addition, azimuth-type /3 propulsors capable of swiveling 360 degrees around the vertical shaft lines are utilized as the swiveling propellers 3.

[0010] Because of the above structure of the ship of this embodiment equipped with swiveling propellers, the swiveling operations of the swiveling propellers 3 for steering provided to the right and left of the stern make it possible to steer the ship more efficiently while greatly reducing the generation of underwater noises in comparison to a conventional tunnel-type side thruster. Moreover, the application of the swiveling propellers 3 is expected to reduce noises by about 7dB in comparison to a case in which a conventional tunnel-type side thruster is equipped.

[0011] As for the propeller 1 for propulsion, the flow of water through the propeller 1 for propulsion is not influenced despite the presences of the swiveling propellers 3 since the propellers 3 are located at the lower ends of the struts 3a provided to both boards located posterior to the propeller 1 for propulsion. This, combined with the fact that the propeller 1 for propulsion is a regular type equipped posterior to the bossing 2a of the stern, makes it possible to obtain large thrust forces by sufficiently increasing the output of the driving system. Moreover, since the swiveling propellers 3 for steering can swivel 360 degrees,

there are advantages in that the ship equipped with the propellers 3 can be steered appropriately and also in that the swiveling propellers 3 can be used, if necessary, for propulsion by being made to swivel in a manner such that the thrust force will be directed forward.

[0012] Next, the ship of the second embodiment of the invention equipped with swiveling propellers will be explained. Also in this case, as shown in Figure 3 and Figure 4, a propeller 1 for propulsion is equipped posterior to the bossing 2a of the hull 2 at the center of the stern, and this propeller 1 is rotated by the main machine inside the ship via a propeller shaft running through the bossing 2a. Moreover, swiveling propellers 3 for steering are equipped at the lower ends of struts 3a protruding downward from the hull 2 at both boards located posterior to the propeller 1 for propulsion, and in the same manner as the first embodiment described earlier, the propellers 3 are composed of azimuth-type propulsors that are rotated by an auxiliary engine or the like inside the ship via the shaft systems running inside the struts 3a and are made to swivel 360 degrees around vertical shaft lines by another driving system.

[0013] Furthermore, this second embodiment is specifically equipped with a ladder 4 located posterior to the propeller 1 for propulsion, and the propellers 3 for steering are located on the left and right of the ladder 4 and away from the ladder 4 by sufficient distances. In addition to the fact that the above-described ship of the second embodiment equipped with swiveling propellers demonstrates the same effects as those of the first embodiment, the ship can also be steered more accurately during

sailing because of the regular ladder 4 also being equipped in addition to the swiveling propellers 3 for steering.

[0014] [Effects of the Invention]

As described in detail earlier, a ship of the invention equipped with swiveling propellers can yield the following effects.

(1) Sufficiently high outputs can be achieved by the propeller for propulsion provided at the center of the stern, and at the same time, the ship can be steered efficiently by means of the swiveling propellers for steering provided to the left and right boards of the stern. Moreover, the generation of underwater noises can be greatly reduced in comparison to a conventional tunnel-type side thruster.

(2) Since the swiveling propellers for steering are attached to the lower ends of the struts protruding downward from both boards located posterior to the propeller for propulsion, the swiveling propellers for steering can be operated without influencing the flow of water through the propeller for propulsion.

(3) Since a regular ladder is disposed posterior to the propeller for propulsion in addition to the above-mentioned swiveling propellers for steering, the ship can be steered even more accurately during sailing.

(4) Since the above-mentioned swiveling propellers for steering are capable of swiveling in the range of 360 degrees, the ship can be steered appropriately by means of the propellers, and these propellers can also be utilized for propulsion if necessary.

[Brief Description of the Drawings]

[Figure 1] A front view showing the stern of the ship of the first embodiment of the invention equipped with swiveling propellers.

[Figure 2] A side view showing the stern of the ship of Figure 1.

[Figure 3] A front view showing the stern of the ship of the second embodiment of the invention equipped with swiveling propellers.

[Figure 4] A side view showing the stern of the ship of Figure 3.

[Figure 5] A front view showing the stern of a ship equipped with a conventional tunnel-type side thruster.

[Figure 6] A side view showing the stern of the ship of Figure 5.

[Figure 7] A front view showing the stern of a ship equipped with a conventional swiveling propeller.

[Figure 8] A side view showing the stern of the ship of Figure 7.

[Descriptions of the Reference Numerals]

1 = propeller for propulsion

2 = hull

2a = bossing

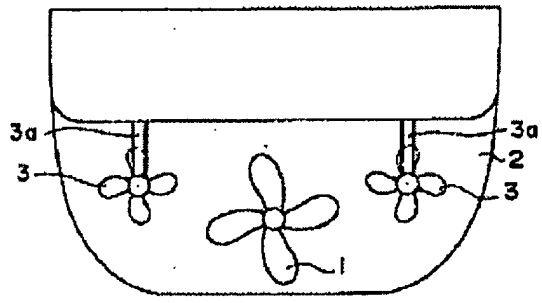
3 = swiveling propeller

3a = strut

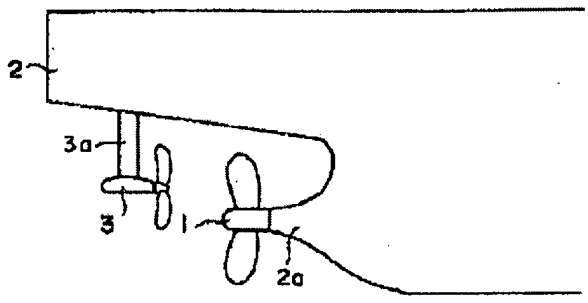
4 = ladder

5 = tunnel-type side thruster

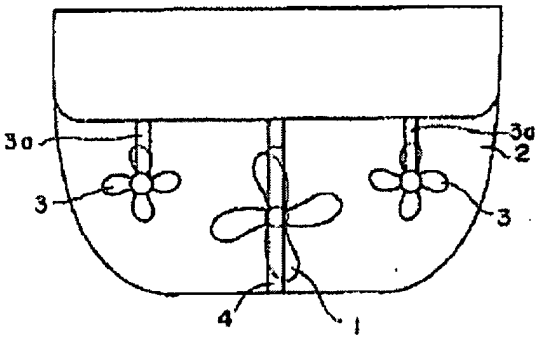
[Figure 1]



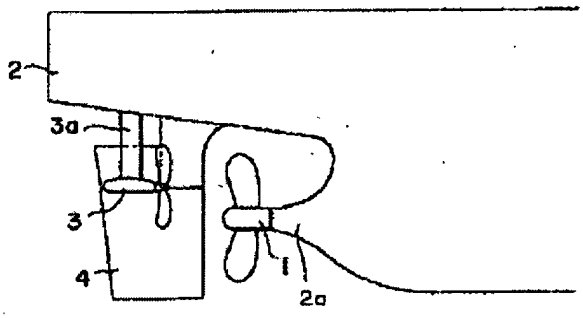
[Figure 2]



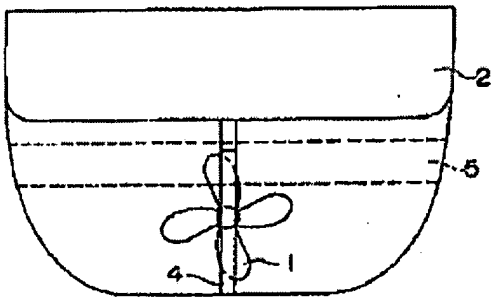
[Figure 3]



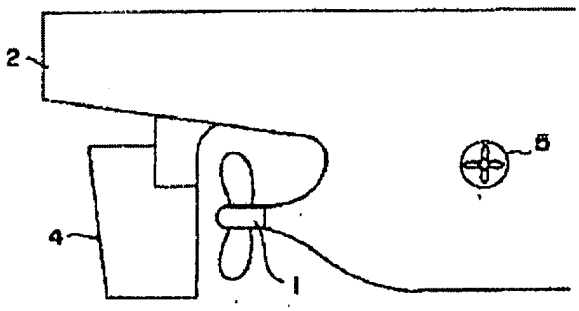
[Figure 4]



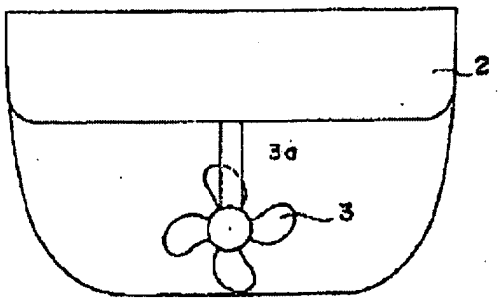
[Figure 5]



[Figure 6]



[Figure 7]



[Figure 8]